DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in the pending application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6, 17-23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. (U.S. Patent 6,288,698) in view of Beck et al. ("Motion Dithering for Increasing Perceived Image Quality for Low-Resolution Displays" 13 July 1998, pages 407-410).

In reference to claim 1, Ishii et al. discloses a method for processing video data of video pictures in a video data processing device for display on a display device having a plurality of luminous elements to suppress a dithering pattern from appearing to a viewer observing a moving object on the picture (see column 1, lines 35-53, column 2, lines 35-38, 46-55 and Figure 1A wherein Ishii et al. discloses a method and system for control of gray scale and brightness characteristics of a display device so that artifacts are eliminated including video dither and checker-like patterns.), the method comprising:

applying a dithering function to at least part of said video data in a dithering device of the video data processing device (see column 4, lines 48-64 and Figures 1A & 6 wherein Ishii et al. discloses applying dither patterns to input RGB data. Ishii et al. explicitly discloses inverting the patterns in certain conditions which the Examiner interprets as functioning equivalent to a dithering function since the patterns are applying certain values at certain conditions.), wherein the dithering improves a grey scale portrayal of video pictures of said video data (see column 2, lines 50-59 wherein Ishii et al. discloses stabilizing gray-scale display of data by controlling the RGB input data via programmable parameters such as dithering pattern characteristics.),

computing at least one motion vector representing the movement of a moving object on a picture from said video data, in a motion estimator device of the video data processing device;

changing at least one of the phase, amplitude, spatial resolution and temporal resolution of said dithering function in accordance with said at least one motion vector representing the movement of a moving object on a picture when applying the dithering function to said video data in the dithering device of the video data processing device to suppress a dithering pattern from appearing to a viewer observing the moving object on the picture; and

outputting the dithered video data from the video data processing device to the display device to suppress a dithering pattern from appearing to a viewer *observing the moving object on the picture on the display device* (see column 1, lines 35-53, column 2, lines 35-38, 46-55, column 3, lines 35-50 and Figure 1A wherein Ishii et al. discloses outputting the dithered data to a display device so that artifacts are eliminated including video dither and checker-like patterns.).

Ishii et al. does not explicitly disclose computing at least one motion vector representing movement of a moving object however Beck et al. does. Beck et al. discloses techniques for

increasing the apparent image quality of a displayed image implementing motion dithering which takes both spatial and temporal qualities of a display device to increase the perceived image quality (see "Abstract" & "Objective and Background", page 407). Beck et al. explicitly discloses computing a motion vector representing the movement of the original image over a frame or series of frames to offset the image with respect to the pixels on the final output device (see "Results"& Figure 4, page 408). Beck et al. further discloses utilizing the motion vector in calculating a dithered value for a final resulting image (see pages 408-409, "Results"). Note, the Examiner interprets that the motion vector calculating techniques, incorporated with the dithering techniques of Beck et al. change at least a spatial resolution (if not also a temporal resolution) of the dithering since the motion vector shifts or offsets the pixels of the original image with respect to the display pixels (see left column, page 409 thru right column 409, starting with "Motion Dithering takes..." and Figure 5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the motion dithering techniques of Beck et al. with the gray scale dithering techniques of Ishii et al. in order to create a higher displayable image quality without increasing a display device's pixel resolution (see page 408, last paragraph of "Objective and Background" of Beck et al.), which is costly, incurs additional and/or stricter hardware requirements and component space issues. As per the specific limitation of the "motion estimator device," Beck et al. explicitly discloses implementing such motion estimation techniques in hardware or software (see "Objective and Background", page 407), therefore one of ordinary skill in the art would easily be inclined to execute these techniques in a suitable hardware or software implementation. (see *Response to Arguments* below)

In reference to claims 2 and 18, Ishii et al. and Beck et al. disclose all of the claim limitations as applied to claims 1 and 17 respectively in addition, at least Ishii et al. inherently discloses the dithering patterns having two spatial dimensions (x,y or row,col) and a temporal dimension (frame count/number) (see column 2, lines 50-58 and Figure 6).

In reference to claims 3 and 19, Ishii et al. and Beck et al. disclose all of the claim limitations as applied to claims 1 and 17 respectively in addition, Ishii et al. discloses applying dither patterns to input RGB data (see column 4, lines 48-64 and Figures 1A & 6).

In reference to claims 4 and 20, Ishii et al. and Beck et al. disclose all of the claim limitations as applied to claims 1 and 17 respectively in addition, Ishii et al. discloses applying dither patterns to input RGB data (see column 4, lines 48-64 and Figures 1A & 6). Note, the Examiner interprets the RGB data or subpixel data that the dither patterns of Ishii et al. are applied to equivalent to Applicant's "luminous elements" and "cells" of the display device.

In reference to claims 5 and 21, Ishii et al. and Beck et al. disclose all of the claim limitations as applied to claims 1 and 17 respectively in addition, Ishii et al. discloses the dithering function as a 4-bit function since patterns are configured 4x4 and accessed using 0001-1111 addressing (see column 4, lines 48-64 and Figure 6).

In reference to claims 6 and 22, Ishii et al. and Beck et al. disclose all of the claim limitations as applied to claims 1 and 17 respectively in addition, since Beck et al.'s motion vector dithering is based upon an apparent pixel width (see "Results" equation "w=", page 408), the Examiner interprets the motion vector is definable for each pixel individually since the width of each pixel is incorporated into the motion dithering calculation.

In reference to claim 17, claim 17 is equivalent in scope to claim 1 and is therefore rejection under like rationale. In addition to the above rationale as applied to claim 1 above, claim 17 further discloses the device for performing the dithering including a dithering device, a motion estimator connected to the dithering device and a means for outputting the dithered data to the display device. As can be seen in Ishii et al., Figure 1A, Ishii et al.'s configuration of hardware includes dithering logic and an output mux. As per the specific limitation of the "motion estimator," Beck et al. explicitly discloses implementing such motion estimation techniques in hardware or software (see “Objective and Background”, page 407), therefore one of ordinary skill in the art would easily be inclined to execute these techniques in a suitable hardware or software implementation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the motion dithering techniques of Beck et al. with the gray scale dithering techniques of Ishii et al. in order to create a higher displayable image quality without increasing a display device's pixel resolution (see page 408, last paragraph of “Objective and Background” of Beck et al.), which is costly, incurs additional and/or stricter hardware requirements and component space issues.

In reference to claim 23, Ishii et al. and Beck et al. disclose all of the claim limitations as applied to claim 17 in addition, Beck et al. explicitly discloses the motion vector to comprise of two components defining two spatial dimensions, mx, my (see "Results" of page 408).

In reference to claim 25, Ishii et al. and Beck et al. disclose all of the claim limitations as applied to claim 17 in addition, Ishii et al. discloses a FRC (frame rate control) logic connected to the dithering logic for temporally controlling the dithering based upon video data frames (see columns 5-6, lines 39-53 and Figures 1A, 3).

3. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. (U.S. Patent 6,288,698), Beck et al. ("Motion Dithering for Increasing Perceived Image Quality for Low-Resolution Displays" 13 July 1998, pages 407-410) and further in view of Wu et al. (U.S. Patent 6,469,708).

In reference to claim 24, Ishii et al. and Beck et al. disclose all of the claim limitations as applied to claim 17. Neither Ishii et al. nor Beck et al. explicitly disclose a gamma function means pre-correcting input data before it is passed to the dithering means. Wu et al. discloses an image dithering technology that implements a gamma table for performing gamma correction upon input data before such data is dithered (see column 1, lines 9-12, column 2, lines 11-23 and Figures 1-2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the gamma correction techniques of Wu et al. with the motion dithering techniques of Beck et al. and gray scale dithering techniques of Ishii et al. in order to correct for nonlinearities in the different display devices which would provide a more accurate signal to perform processing upon initially, ultimately leading to a more accurate output.

Response to Arguments

4. Applicant's arguments filed 02/25/10 have been fully considered but they are not persuasive.

In reference to claims 1-6 and 17-25, Applicant argues that Ishii et al. makes no teaching of a method to suppress a dithering pattern resulting from a moving object observed by a viewer (see page 6 of Applicant's Remarks). Applicant goes on to state that Ishii et al. is directed to eliminating screen beating or flickering and not dithering patterns (see page 7 of Applicant's

Remarks). In response, the Examiner disagrees and states that firstly, the claims call for a "suppression" and <u>not</u> an "elimination" of dithering pattern(s) from view. The Examiner states that suppression is not interpreted equivalent to elimination. This said, Ishii et al. discloses that reduced gray-scaling, as performed by the invention, effectively smoothens gray-shade display and RGB distributed dithering (see column 2, lines 59-67). Therefore, the Examiner interprets that the techniques utilized in Ishii et al. can surely be interpreted as "suppressing" dithering artifacts since "smoothing" of dithered data is explicitly performed. The Examiner therefore, maintains the previous rejection based upon Ishii et al.

Further, in reference to claims 1-6 and 17-25, Applicant argues that Beck et al.'s motion vector does not represent movement of a moving object but instead corresponds to a static object (see pages 7-8 of Applicant's Remarks). In response, the Examiner disagrees and states, taking the broadest reasonable interpretation of the prior art and claim language, the phrase, "representing the movement of a moving object" is exactly what is taught by Beck et al.. Beck et al. explicitly discloses computing a motion vector representing the movement of the original image over a frame or series of frames to offset the image with respect to the pixels on the final output device (see "Results"& Figure 4, page 408). In other words, the object in Beck et al. is moving across a series of frames and the vector is tracking or representing its movement. Therefore, the Examiner interprets the interpretation of Beck et al. to be just and maintains the current rejection.

Lastly, in reference to claims 16 and 17-25, Applicant argues that Ishii et al. cannot be combined with the teachings of utilizing a motion vector for dithering since replacing the phase number of pixels with a motion vector would yield the same dithering value for all pixels (see

pages 8-9 of Applicant's Remarks). In response, the Examiner firstly states that Applicant has based the above rationale by performing a piecewise analyzation of each reference, by combining and/or omitting specific aspects of each cited prior art (Ishii et al. and Beck et al.'s motion vector teachings). Assuming Applicant's arguendo, the Examiner states that a system wherein like dithering values are output would in effect achieve the results desired/produced by the claimed invention, that is "suppressed" dithering patterns. Therefore, the Examiner believes Ishii et al. to be fully applicable to the invention at hand and maintains the previous rejection herein.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Antonio Caschera whose telephone number is (571) 272-7781.

The examiner can normally be reached Monday, Tuesday, Thursday and Friday between 7:00 AM and 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung, can be reached at (571) 272-7794.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

571-273-8300 (Central Fax)

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (571) 272-2600.

/Antonio A Caschera/

Primary Examiner, Art Unit 2628

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